Fixed points for the limit of rapid-change model

$$g_1' = \frac{g_1}{u_1}, \quad w = \frac{1}{u_1},$$

$$\beta_{g_1'} = g_1'(\eta - y + \gamma_D - 2\gamma_v),$$

$$\beta_{g_2} = g_2(-\epsilon - \gamma_{g_2}),$$

$$\beta_{u_2} = -u_2\gamma_{u_2},$$

$$\beta_w = w(\eta - \gamma_D),$$

$$\beta_a = -a\gamma_a,$$

anomalous dimensions γ

$$\gamma_D = \frac{g_1'}{4(1+w)}\left(3 + \alpha\frac{1-w}{1+w} + \frac{4\alpha a(1-a)w^2}{(1+w)^2}\right) + \frac{g_2}{8},$$

$$\gamma_a = (1-2a)\left(\frac{g_1'\alpha(1-a)w^2}{2(1+w)^3} + \frac{g_1'u_2}{4a(1+w)}\left[3 + \alpha - \frac{2\alpha w}{1+w}\right] + \frac{g_2}{8a}\right),$$

$$\gamma_{u_2} = \frac{g_1'(1-2u_2)}{4(1+w)}\left(3 + \alpha\frac{1-w}{1+w} + \frac{2\alpha a(1-a)w^2}{u_2(1+u_1)^2}\right) - \frac{g_2}{8},$$

$$\gamma_{g_2} = -\frac{3g_1'}{2(1+w)} + \frac{g_1'\alpha}{1+w}\left(\frac{(1-2a)^2}{2} + w\frac{1-3a(1-a)}{1+w} + \frac{2a(1-a)w}{(1+w)^2}\right) - \frac{3g_2}{2},$$

$$\gamma_v = \frac{g_1'\alpha w}{4(1+w)^2}\left(\frac{4a(1-a)w}{1+w} - 1\right) + \frac{g_1'u_2}{2(1+w)}\left(3 + \frac{\alpha}{1+w}\right),$$

Fixed points

- FP I

$$g_1'^* = 0, \quad g_2^* = 0, \quad w^* = 0, \quad a^* \text{ not fixed}, \quad u_2^* \text{ not fixed}$$

$$\Omega_1 = -\epsilon, \quad \Omega_2 = \eta, \quad \Omega_3 = \eta - y$$

- FP II

$$g_1'^* = 0, \quad g_2^* = \frac{2\epsilon}{3}, \quad w^* = 0, \quad a^* = \frac{1}{2}, \quad u_2^* = 0$$

$$\Omega_1 = \frac{\epsilon}{12}, \quad \Omega_2 = \frac{\epsilon}{6}, \quad \Omega_3 = \epsilon, \quad \Omega_4 = -\frac{\epsilon}{12} + \eta, \quad \frac{\epsilon}{12} + \eta - y$$

- FP III

$$g_1'^* = \frac{4(y-\eta)}{\alpha+3}, \quad g_2^* = 0, \quad w^* = 0, \quad a^* \text{ not fixed }, \quad u_2^* = 0$$

$$\Omega_1 = 2\eta - y, \quad \Omega_2 = \eta - y, \quad \Omega_3 = -\epsilon + \frac{2[(1-2a)^2\alpha - 3]}{\alpha+3}(\eta - y),$$
$$\Omega_4 = y - \eta$$

- FP IV

$$g_1'^* = \frac{4(\eta-y)}{\alpha+3}, \quad g_2^* = 0, \quad w^* = 0, \quad a^* = \frac{1}{2}, \quad u_2^* = \frac{1}{2}$$

$$\Omega_1 = y - \eta, \quad \Omega_2 = \eta - y, \quad \Omega_3 = \eta - y, \quad \Omega_4 = y, \quad \Omega_5 = -\epsilon + \frac{6}{\alpha+3}(\eta - y)$$

- FP V

$$g_1'^* = \frac{2(12y - 12\eta - \epsilon)}{3(5+2\alpha)}, \quad g_2^* = \frac{4[(3+\alpha)\epsilon - 6y + 6\eta]}{3(5+2\alpha)}, \quad w^* = 0, \quad a^* = \frac{1}{2}, \quad u_2^* = 0$$

$$\Omega_1 = \frac{\epsilon(\alpha+3) + 6(\eta - y)}{3(5+2\alpha)}, \quad \Omega_2 = 2\eta - y, \quad \Omega_3 = \frac{(\alpha+3)\epsilon + 3(2\alpha+7)(\eta-y)}{3(2\alpha+5)},$$
$$\Omega_4 = \frac{-(2\alpha+5)\sqrt{A} + B}{12(2\alpha+5)^2}, \quad \Omega_5 = \frac{(2\alpha+5)\sqrt{A} + B}{12(2\alpha+5)^2},$$
$$A = (169\alpha^2 + 990\alpha + 1449)\epsilon^2 + 24(13\alpha^2 + 144\alpha + 309)\epsilon(\eta - y) + 144(\alpha^2 + 18\alpha + 69)(\eta - y)^2,$$
$$B = 11(2\alpha^2 + 11\alpha + 15)\epsilon + (y - \eta)(24\alpha^2 - 12\alpha - 180).$$

- FP VI

$$g_1'^* = 2\frac{\epsilon + 4\eta - 4y}{2\alpha+9},$$
$$g_2^* = 4\frac{6(y-\eta) + (\alpha+3)\epsilon}{3(2\alpha+9)},$$
$$w^* = 0, \quad a^* = \frac{1}{2},$$
$$u_2^* = \frac{3(y-\eta)(2\alpha+7) - (\alpha+3)\epsilon}{3(\alpha+3)(4y - 4\eta - \epsilon)}$$

$$\Omega_1, \quad \Omega_2, \quad \Omega_3,$$
$$\Omega_4 = \frac{-2(3+\alpha)\epsilon + 3[4\eta + (5+2\alpha)y]}{3(2\alpha+9)},$$
$$\Omega_5 = \frac{2(3+\alpha)\epsilon + 3(5+2\alpha)(\eta - y)}{3(2\alpha+9)}$$

- FP VII

$$g_1'^{*} = \frac{\eta - y}{3+\alpha}, \quad g_2^* = 2(y-\eta), \quad w^* = 0, \quad a^*(1-a^*) = \frac{3+\alpha}{2\alpha}\left(\frac{\epsilon}{\eta - y} + \frac{7\alpha+15}{2\alpha+6}\right), \quad u_2^* = 1$$

$$\Omega_1 = \eta, \quad \Omega_2, \quad \Omega_3, \quad \Omega_4, \quad \Omega_5$$